

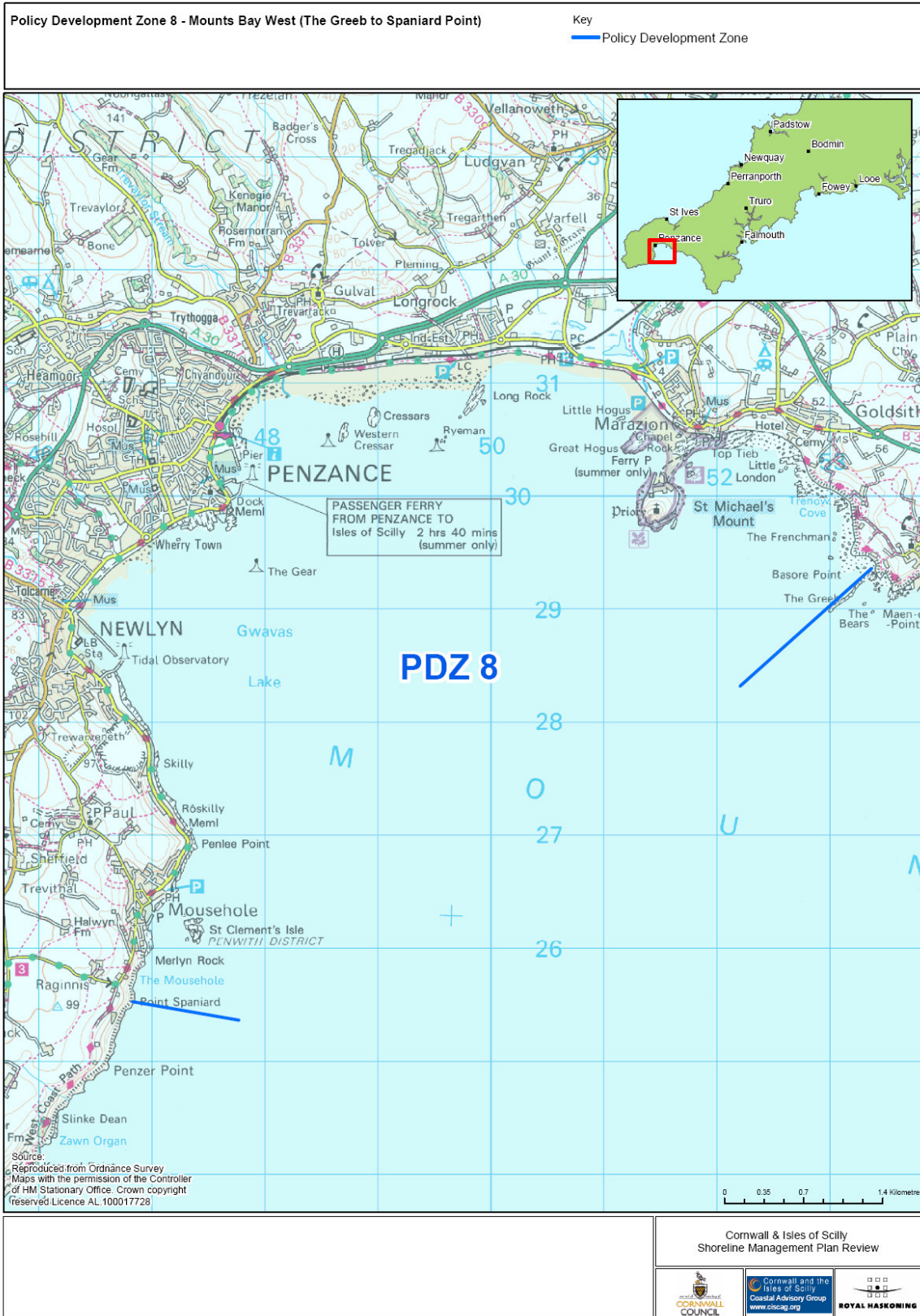
PDZ: 8	Mount's Bay West (The Greeb to Point Spaniard) (Including Marazion and St Michael's Mount)	Management Area 19 Management Area 20 Management Area 21 Management Area 22
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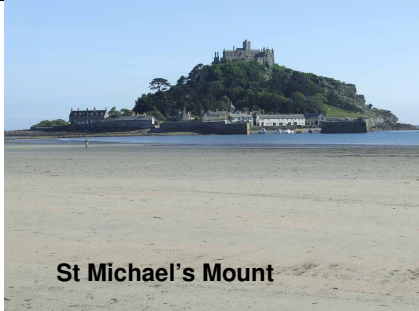



Mount's Bay West (The Greeb to Point Spaniard)

The area of Marazion (The Greeb) to Point Spaniard is one of high human activity at the coast with a vitality and independent spirit reflective of being the largest community at the south western tip of the UK mainland. Penzance and the neighbouring communities and development at Longrock, Wherry Town and Newlyn almost merge into one densely developed area focussed around the fishing and tourism industries, squeezed between the coast and the A30 route which continues on to Lands End. The other communities in this area, Marazion and Mousehole have maintained a clear separation from the sprawl. Marazion Marsh provides a buffer between Longrock and Marazion itself and St Michael's Mount provides an identity and focus for the community.

There has been a harbour at Newlyn since medieval times, and today it is the one of the major fishing harbours in the UK, contributing millions of pounds to the Cornish economy each year. Although some of the historic fishing village had been redeveloped over the years the community of Newlyn retains a strong identity with the fishing industry, the same being true also of Mousehole, whose traditional fishing cottages still remain clustered around the harbour.



General Description	
Built Environment	
<p>The number of fixed assets at the coast are substantial and include large numbers of residential and commercial property, key transport infrastructure including the A30 road and Penzance to London railway line, a heliport and Penzance harbour with its ferry service to the Isles of Scilly.</p> <p>As Penzance is the commercial centre for the Land's End Peninsula, there is significant critical infrastructure in the area including two emergency response centres (police and ambulance), and six electricity substations. Schools and care homes are also present. There is extensive structural protection of the coast, including breakwaters at the three harbours and linear defences at Newlyn, Marazion, Longrock, Wherry town and a revetment south of Newlyn harbour. Penlee Quarry fronts the coastline south of Penzance.</p>	 <p style="text-align: center;">Penzance Heliport</p>  <p style="text-align: center;">Newlyn Harbour</p>
Heritage	
<p>St Michael's Mount is an iconic symbol for the area and indeed the whole of Cornwall. The site is owned by the National Trust and the major tourist attraction in the area. Other historic features are Newlyn and Mousehole historic harbours, Mount's Bay submerged forest and the Jubilee Pool (Penzance lido).</p>	 <p style="text-align: center;">St Michael's Mount</p>

Environment and Nature Conservation	
<p>The major nature conservation interest is Marazion Marsh. It is of European importance with its SPA designation, as well as nationally recognised as a SSSI and RSBP reserve. The Penlee Point SSSI is located to the south of Newlyn.</p> <p>There are significant coastal process pressures affecting Marazion Marsh, with saline intrusion and storm surge becoming more frequent events. Wave driven erosional pressures on the dunes and foreshore defences which front the marsh are expected to increase in line with rising sea levels and increased storminess.</p>	<p data-bbox="1029 324 1220 358">Marazion Marsh</p> 
Recreation and Amenity	
<p>There is a continuous, fairly wide, sand and shingle beach in place between Marazion and Penzance. This provides a popular amenity resource with the beach providing the 'yellow lung' for the resident population and tourists. The Cornish Way cycle route which runs from Land's End to Bude, hugs the coast between Mousehole and Marazion and provides stunning views across Mount's Bay. The SW Coast Path follows the shoreline along the cliff edge east of Marazion, skirts seaward of the dunes and Marazion Marsh and on through Penzance, Newlyn and Mousehole.</p>	<p data-bbox="1005 929 1260 985">Marazion to Longrock beach</p> 
Key Values and Drivers	
<p>The almost continually defended coastline from Marazion to Point Spaniard is one of the most pressurised lengths of shoreline within the SMP area. Although it is a more sheltered length of coastline than the eastern part of Mount's Bay, the constraints placed upon it by the presence of hard defence structures mean that it is likely to display high sensitivity to sea level rise and increased storminess.</p> <p>An important consideration for the whole area are proposed development and regeneration plans, including the proposed ro-ro ferry terminal as part of the new ferry link to the Isles of Scilly. This is proposed for the existing harbour area. In addition to this are proposals relating to regeneration of the Promenade / Wherry Town frontage, regeneration of Newlyn and its harbour area and development plans for Penlee Quarry. These proposals have been subject to a number of technical investigations by the Penzance, Newlyn and Penlee Technical Investigations Team.</p> <p>The key value of this area is that it is the focus of development and commercial activity for the Land's End peninsula, which means that the remote and unspoilt nature of the peninsula can be sustained. The amenity value of the beaches and the environmental value of Marazion Marsh, is vital to sustain the Mount's Bay community and cater for</p>	

tourists drawn to the area. St Michael's Mount is an iconic landmark which unites the Mount's Bay area and promotes a further sense of Cornwall to that also provided by the significant fishing activity in the area.

- Transport infrastructure important at county level – mainline railway and A30 main road
- Penzance as the commercial centre for the Land's End peninsula
- St Michael's Mount scheduled monument and iconic Cornish landmark
- Nationally important fishing fleet at Newlyn
- Marazion Marsh SPA, SSSI and RSBP nature reserve
- 'Yellow lung' of the beach fronting Penzance and Marazion

PDZ Management Intent

The overarching management principle is therefore to promote shoreline management which supports the adaptation and resilience of this continuously defended coastline to changes in the coastal conditions. This in itself should help to maintain the commercial viability of the area. Identifying opportunities to realign both shoreline and transport links to establish a more sustainable long-term shoreline position are an important part of the management intent.

Wherever possible, the management intent would be to introduce more width into the intertidal area. This would support and enhance both the natural defence provided by the foreshore and recreational opportunities. Appropriate management should be taken at St Michael's Mount, to provide continued access to the Mount but without interrupting natural coastal processes.

Physical Coastal Processes (further details are provided in Appendix C)

The almost continually defended coastline from Marazion to Point Spaniard is one of the most pressurised lengths of shoreline within the SMP area. Although it is a relatively sheltered length of coastline, the constraints placed upon it by the presence of hard defence structures mean that it is likely to display high sensitivity to sea level rise and increased storminess.

TIDE AND WATER LEVELS (mODN)

Location	LAT	MLWS	MLWN	MHWN	MHWS	HAT	Neap range	Spring range	Correction CD/ODN
Newlyn	-	-2.25	-	-	2.55	-	-	4.80	-3.05
Extremes(mODN)									
Location:	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000	
Newlyn	3.12	3.32	3.42	3.48	3.59	3.66	3.76	3.85	

Wave Climate

This coastline is relatively sheltered from the dominant westerly Atlantic wave climate due to the sheltering effect of the Penwith Peninsula. Although it receives less wave energy than the coastline to the east of Marazion, the Longrock to Penzance Harbour

frontage still displays a sandy intertidal area in common with much of the higher energy Cornish coast and it does periodically receives large amounts of wave energy during storm events which originate from due south and the south east.

The wave climate at Penzance and Newlyn is for most of the time relatively low energy, with the frontage being sheltered from all but the largest of the dominant westerly Atlantic swells. Large swells of 5m+ with long wave periods will refract around the Penwith Peninsula and produce waves of limited height along the Newlyn and Penzance frontage. The infrequent but occasionally severe storms from the south-east can however produce occasional nearshore wave heights exceeding 4m and these infrequent events have historically caused damage, overtopping and flooding along the Newlyn and Penzance frontage.

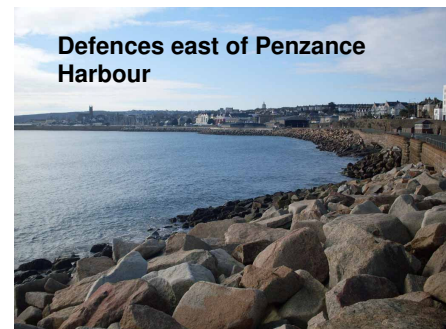
The tidal range in this area is around 3.6m. Residual tidal currents are typically less than 1 m/s, and drive no significant sediment transport. They are generally weaker at around 0.5m/s within Mounts Bay but there is possibly some net eastward sediment transport attributed to the residual tidal flow pattern.

PROCESSES

Control Features:	
Mylor slates form the dominant bedrock geology. Harder granite forms St Michael's Mount and some of the shoreline rock outcrops. These rocky outcrops on the foreshore are important physical controls on the shape of the beaches within this area, particularly along the Wherry Town frontage.	
St Michael's Mount is an important physical control on the coastline. It acts to trap sediment on its western side and provides some shelter from the wave climate to the Marazion frontage.	
Existing Defences:	
Development of this area has resulted in extensive structural protection of the coast, including breakwaters at the three harbours and linear defences at Newlyn, Wherry town and a revetment south of Newlyn harbour. There are also linear defences stretching almost continuously from Marazion through to Penzance harbour along the Longrock frontage (a combination of sloped revetments, rock and masonry walls). The Penlee quarry is also protected with a masonry seawall. The Jubilee Pool (Lido) is protected by a wall at	A very significant component of the defences within this PDZ is the 1.25km of rock revetment which defends the position of the railway line, station and railway sidings. The revetment is maintained by Railtrack and as such the continued presence of the defence and availability of funding for its maintenance must be considered within the development of policy.

Battery Rocks. In addition there are the defences and harbour structures which exist on St Michael's Mount.

The small dune system at Marazion provides protection to West End Rd, Green Lane and the Red River Bridge and the associated hard defences. The toe of the dunes has remained relatively stable in response to the building of defences and dune strengthening strategies. MLW has retreated, causing gradual loss of intertidal and a steepening of the beach slope.



Processes:

There are weak sediment links along this frontage, due to a weak net eastward tidal residual drift. Sediment transport is primarily wave driven. The weak residual tidal currents of Mount's Bay have relatively little affect on transport, although they may contribute toward a slight net eastward drift (accumulation of sediment on the western side of St Michael's Mount and its causeway supports this view). Most transport is therefore across the shore face and varies in response to seasonal variations in the wave climate.

Sediment accumulations in Mount's Bay are significant compared to adjacent sections of coast, however there is no evidence that there is a mechanism for net shoreward transport of this material. Historically, significant beach volume and intertidal area has been lost from the Wherry Town frontage and a lowering of foreshore levels at Marazion has also been recorded. A general trend of stability in MHW position is observed across the beach whereas a retreat of MLW has been observed over the period 1888 - 2000. This indicates that a trend of gradual coastal squeeze may be established along much of this frontage, however the beach to the south of Newlyn Harbour (Sandy Cove) has accreted strongly, suggesting a northerly sediment transport potential from Penlee Point towards the harbour. In the areas free of defences the beach sediment is coarse (>2cm) and so is only mobilised by larger waves.

Unconstrained Scenario:

Although unrealistic, because of the residual impact of defences, this scenario considers how the coast would evolve in the absence of defences.

The frontage from Marazion to Newlyn is low-lying and would be likely to undergo quite rapid recession in the absence of defences. The sandy dune areas at Marazion would roll back in response to sea level rise and the four tidal inlets along the Marazion to Penzance frontage would be regularly inundated during storm surge. The Marazion Marsh would undergo increasingly frequent inundation from high tides and storm surges and would go through transitional phases from freshwater, to brackish, to fully saline habitat over the period of 100 years. Flood risk to development around the marsh would increase accordingly and by 2105 the actual position of the shoreline could migrate inland by up to 800m in places. It should be noted therefore that if it were allowed to develop, the unconstrained scenario would destroy the integrity of the Marazion Marsh SPA.

St Michael's Mount would be subject to erosion around the existing harbour and

causeway area, with associated retreat of the shoreline and the Marazion town frontage could experience 100 – 200m of shoreline recession by 2105.

The Wherry Town frontage, historically an area of dunes and therefore with little hard geology to arrest the rate of recession, could be expected to retreat by up to 140m in the next 100 years. The rocky outcrops around the Penzance Harbour would slow down the rate of retreat there, but the linearly developed Eastern Green area (containing the heliport, main rail link and the A30 road) may experience retreat of up to 120m.

From Newlyn around to Mousehole the geology becomes higher and more resistant and recession of the shoreline would be less dramatic, possibly in the region of 10m over 100 years along the currently defended route of Cliff Road.

A result of the initial rapid recession of large parts of the frontage would be large sediment inputs into the nearshore zone – this would provide sand to the beaches which would increase their intertidal width – this in itself may then slow further shoreline recession in the short to medium term, but beyond that much would depend on how aggressively sea levels are rising and how changes in the storminess of the maritime climate occur.

Under the unconstrained scenario therefore, it could be expected that large parts of both the Marazion and Penzance frontages would be lost to erosion and flooding with much of the regionally important infrastructure damaged or lost.

POTENTIAL BASELINE EROSION RATES

Base rates have been assessed from monitoring and historical data. The range of potential erosion is assessed in terms of variation from the base rate and sensitivity in potential sea level rise. The base rates provided below are taken as an average based on historical records. The rates are a composite value based on erosion of the toe and recession of the crest of the cliff and reflect the erosion rates following failure of defences.

(Sea Level Rise assumed rates: 0.06m to year 2025; 0.34m to year 2055; 0.96m to year 2105.)

Location	Historic recession rate (lower) (m/100 yr)	Historic recession rate (upper) (m/100 yr)	Projected 100 year erosion rate (lower) (m)	Projected 100 year erosion rate (upper) (m)	Notes
St Michael's Mount	108	182	196.6	331.2	
Marazion	54	82	109.1	190.2	Dunes
Penzance	24	95	48.5	220.4	rock armour, concrete revetment and gabions
Newlyn	10	50	22.2	141	Stone wall, 100 year SoP

BASELINE MANAGEMENT SCENARIOS

PRESENT MANAGEMENT

Present Management is taken as that policy defined by SMP1, modified by subsequent strategies or studies. It should be noted that both in the case of SMP1 and that of many of the strategies undertaken before 2005, the period over which the assessment was carried out tended to be 50 years.

SMP1		
MU	LOCATION	POLICY
6E1	The Greeb to St Michael's Mount	Hold the line for currently defended sections, including Mount. Do nothing along undefended sections.
6E1	Chapel Rock to Penzance Harbour	Hold the line along entire frontage.
6E1	Penzance Harbour to Newlyn Harbour	Hold the line.
6E1	Newlyn Harbour to Carn Du	Hold the line from Newlyn to Mousehole and at Mousehole. Do nothing from south of Mousehole to Carn Du.

References: SMP1 Lizard Point to Land's End (Halcrow 1999)

Economic Assessment

The following table provides a brief summary of damages under the No Active Intervention scenario, determined by the SMP2 analysis for the whole PDZ. Further details are provided in Appendix H. Where further, more detailed information is provided by studies, this is highlighted. The table aims to provide an initial high level assessment of potential damages occurring under the erosion and flooding scenarios. The damages for each epoch are discounted present values.

ASSESSMENT OF EROSION DAMAGES

Epoch	0 -20 year		20 – 50 years		50 – 100 years		Total		
No Active Intervention	Number of properties	Present Value x £1000	Number of properties	Present Value x £1000	Number of properties	Present Value x £1000	Number of properties	Present Value Damages (£x1000)	
<i>Location</i>									
PDZ8	24	1452	364	17697	494	9615	882	28764	
Total for PDZ									

ASSESSMENT OF POTENTIAL FLOOD RISK

Epoch	Flood risk tidal 2025		Flood risk tidal 2055		Flood risk tidal 2105		Total	
No Active Intervention	Number of properties	Present Value x £1000	Number of properties	Present Value x £1000	Number of properties	Present Value x £1000	Number of properties	Present Value Damages (£x1000)
<i>Location</i>								
PDZ8	162	1607	184	970	458	650	458	3227

PDZ 8: Mount's Bay West (The Greeb to Point Spaniard) Management Area Statements

Management Areas

PDZ 2 has been sub-divided into 4 principal management areas, these being:

- MA19 Marazion to Longrock
- MA20 Longrock to Penzance
- MA21 Penzance and Newlyn (Albert Pier to Sandy Cove)
- MA22 Mousehole (Sandy Cove breakwater to Point Spaniard)

Within these areas a summary of policy is provided below. Management Areas statements are provided in the following sheets.

MA19 – Marazion to Longrock

Covering previous SMP1 management units:

6E1	The Greeb to St Michael's Mount
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MA20 – Longrock to Penzance

Covering previous SMP1 management units:

6E1	Chapel Rock to Penzance Harbour
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MA21 – Penzance to Newlyn (Albert Pier to Sandy Cove)

Covering previous SMP1 management units:

6E1	Penzance Harbour to Newlyn Harbour
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MA22 – Mousehole (Sandy Cove breakwater to Point Spaniard)

Covering previous SMP1 management units:

6E1	Newlyn Harbour to Carn Du
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